

Docket No.: 210159US0CONT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
Takashi OHNO et al. : ATTN: APPLICATION DIVISION
SERIAL NO: NEW APPLICATION :
FILED: HEREWITH :
FOR: OPTICAL INFORMATION RECORDING
MEDIUM AND OPTICAL RECORDING METHOD

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows.

IN THE SPECIFICATION

Page 1, before line 1, please insert --This application is a Continuation of U.S. Application Serial No. 09/551,566, filed on April 18, 2000, now allowed, which is a Divisional of U.S. Application Serial No. 08/941,720, filed October 1, 1997, now U.S. Patent No. 6,143,486, issued November 7, 2000.--

IN THE CLAIMS

Please cancel Claims 1-4 and 14-21.

Please amend the following claims as shown in the marked-up copy following this amendment.

--5. (Amended) An optical information recording medium having a multilayer structure comprising at least a lower protective layer, a phase-change type optical recording layer, an upper protective layer and a reflective layer, on a substrate, for overwrite recording by modulation of light intensity of at least two levels, so that a crystalline state is an unrecorded state, and an amorphous state is a recorded state, wherein the phasechange type optical recording layer has a composition of $Zn_zGe_y(Sb_xTe_{1-x})_{1-y-z}$, where $0.65 \leq x \leq 0.85$, $0.01 \leq y \leq 0.20$, and $0.01 \leq z \leq 0.15$ and comprises as the main component, an SbTe alloy of the SbTe eutectic composition or a composition including an excess amount of Sb over the SbTe eutectic composition.

9. (Amended) The optical information recording medium according to Claim 5, wherein to carry out an initialization operation by irradiating an energy beam for crystallization, after forming the phase-change type optical recording layer, the recording layer is locally melted and crystallized during resolidification.

10. (Amended) The optical information recording medium according to Claim 5, which is a recording medium whereby mark length modulation recording and erasing are carried out by modulating a laser power among at least 3 power levels wherein to form inter-mark portions, erasing power P_e capable of recrystallizing amorphous mark portions is applied, and to form mark portions having a length nT where T is a clock period and n is an integer of at least 2, writing power P_w and bias power P_b are applied in such a manner that when the time for applying writing power P_w is represented by $\alpha_1 T, \alpha_2 T, \dots, \alpha_m T$, and the time for applying bias power P_b is represented by $\beta_1 T, \beta_2 T, \dots, \beta_m T$, the laser application period is divided into m pulses in a sequence of $\alpha_1 T, \beta_1 T, \alpha_2 T, \beta_2 T, \dots, \alpha_m T, \beta_m T$ to satisfy the following formulae:

$$\text{when } 2 \leq i \leq m-1, \alpha_i \leq \beta_i;$$

$m=n-k$, where k is an integer of $0 \leq k \leq 2$, provided that $n_{\min}-k \geq 1$, where n_{\min} is the minimum value of n ; and

$$\alpha_1 + \beta_1 + \dots + \alpha_m + \beta_m = n-j, \text{ where } j \text{ is a real number of } 0 \leq j \leq 2;$$

and under such conditions that $P_w > P_e$, and $0 < P_b \leq 0.5P_e$, provided that when $i=m$, $0 < P_b \leq P_e$.

12. (Amended) An optical recording method, which comprises carrying out mark length modulation recording and erasing on the optical information recording medium as defined in Claim 5 by modulating a laser power among at least 3 power levels, wherein to form inter-mark portions, erasing power P_e capable of recrystallizing amorphous mark portions is applied, and to form mark portions having a length nT where T is a clock period and n is an integer of at least 2, writing power P_w and bias power P_b are applied in such a manner that when the time for applying writing power P_w is represented by $\alpha_1 T, \alpha_2 T, \dots, \alpha_m T$, and the time for applying bias power P_b is represented by $\beta_1 T, \beta_2 T, \dots, \beta_m T$, the laser application period is divided into m pulses in a sequence of $\alpha_1 T, \beta_1 T, \alpha_2 T, \beta_2 T, \dots, \alpha_m T, \beta_m T$ to satisfy the following formulae:

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and under such conditions that $P_w > P_e$, and $0 < P_b \leq 0.5P_e$, provided that when $i=m$, $0 < P_b \leq P_e$.

Please add the following new claim.

--22. (New) The optical information recording medium according to Claim 5, further comprising a protective coating layer made of an ultraviolet curable or thermosetting resin formed on top of said reflective layer, and wherein said lower and upper protective layers are made of a mixture of ZnS and SiO_2 .--

REMARKS

Claims 5-13 and 22 are pending in this application. Claims 1-4 and 14-21 have been canceled.

This application is a Continuation of U.S. Application Serial No. 09/551,566, filed on April 18, 2000, now allowed, which is a Divisional of U.S. Application Serial No. 08/941,720, filed October 1, 1997, now U.S. Patent No. 6,143,486, issued November 7, 2000.

Applicants submit that the present application is ready for examination on the merits. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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IN THE CLAIMS

Please cancel Claims 1-4 and 14-21.

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9. (Amended) The optical information recording medium according to Claim [1, 2 or] 5, wherein to carry out an initialization operation by irradiating an energy beam for crystallization, after forming the phase-change type optical recording layer, the recording layer is locally melted and crystallized during resolidification.

10. (Amended) The optical information recording medium according to Claim [1, 2 or] 5, which is a recording medium whereby mark length modulation recording and erasing are carried out by modulating a laser power among at least 3 power levels wherein to form inter-mark portions, erasing power P_e capable of recrystallizing amorphous mark portions is

applied, and to form mark portions having a length nT where T is a clock period and n is an integer of at least 2, writing power P_w and bias power P_b are applied in such a manner that when the time for applying writing power P_w is represented by $\alpha_1 T, \alpha_2 T, \dots, \alpha_m T$, and the time for applying bias power P_b is represented by $\beta_1 T, \beta_2 T, \dots, \beta_m T$, the laser application period is divided into m pulses in a sequence of $\alpha_1 T, \beta_1 T, \alpha_2 T, \beta_2 T, \dots, \alpha_m T, \beta_m T$ to satisfy the following formulae:

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$\alpha_1 + \beta_1 + \dots + \alpha_m + \beta_m = n - j$, where j is a real number of $0 \leq j \leq 2$;

and under such conditions that $P_w > P_e$, and $0 < P_b \leq 0.5 P_e$, provided that when $i = m, 0 < P_b \leq P_e$.

12. (Amended) An optical recording method, which comprises carrying out mark length modulation recording and erasing on the optical information recording medium as defined in Claim [1, 2 or] 5 by modulating a laser power among at least 3 power levels, wherein to form inter-mark portions, erasing power P_e capable of recrystallizing amorphous mark portions is applied, and to form mark portions having a length nT where T is a clock period and n is an integer of at least 2, writing power P_w and bias power P_b are applied in such a manner that when the time for applying writing power P_w is represented by $\alpha_1 T, \alpha_2 T, \dots, \alpha_m T$, and the time for applying bias power P_b is represented by $\beta_1 T, \beta_2 T, \dots, \beta_m T$, the laser application period is divided into m pulses in a sequence of $\alpha_1 T, \beta_1 T, \alpha_2 T, \beta_2 T, \dots, \alpha_m T, \beta_m T$ to satisfy the following formulae:

when $2 \leq i \leq m-1, \alpha_i \leq \beta_i$;

$m = n - k$, where k is an integer of $0 \leq k \leq 2$, provided that $n_{\min} - k \geq 1$, where n_{\min} is the minimum value of n ; and

$\alpha_1 + \beta_1 + \dots + \alpha_m + \beta_m = n - j$, where j is a real number of $0 \leq j \leq 2$;

and under such conditions that $P_w > P_e$, and $0 < P_b \leq 0.5 P_e$, provided that when $i = m$, $0 < P_b \leq P_e$.

--22. (New)--

2020-05-16